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NXP, B.V.
NXP INTELLECTUAL PROPERTY DEPARTMENT
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

| EXAMINER | |
|---|---|
| VUONG, QUOCHIEN B | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2618 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/523,429 | BOYLE ET AL. | |
| | Examiner | Art Unit | |
| | Quochien B. Vuong | 2618 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *25 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 5-7, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kemmochi et al. (US 2004/0032706 A1) in view of Sugar et al. (US 6,728,517).

Regarding claim 1, Regarding claim 1, Kemmochi discloses multi-mode radio module (i.e., noted the multi-mode radio module as shown in Figs. 4, 25, 26 and 34 of Kemmochi ) comprising a terminal (i.e., note the terminal as shown in Figs. 3 and 34) for connection to signal propagating and receiving means (i.e., noted the Antenna as shown in Fig. 3 and 34), a transmitting branch (i.e., noted the transmission lines for

EGSM, GSM and PCS as shown in Figs. 4, 26 and 34 of Kemmochi ) coupled to the terminal (i.e., the Antenna as shown in Fig. 3, 25 and 34), and a branching circuit coupled to the terminal (i.e., as shown in Figs. 3, 4, 25, 26 and 34, the branching circuit for EGSM900 and GSM1800/PCS is coupled to the antenna), the branching circuit comprising at least a first and a second branch for receiving signals in first and second frequency bands (i.e., noted the first and second branch for receiving EGSM900 and GSM1800/PCS frequency bands as shown in Figs. 3, 4, 25, 26 and 34), respectively, each of the first and second branches comprising, respectively, a phase shifting circuit (i.e., noted the use of Phase shift circuit LG4, LD4, and Phase shifter 1 & 2 as shown in Figs. 4, 26 and 34 respectively), a band pass filter (i.e., noted the SAW/fg BPF as shown in Figs. 3, 4, 25, 26 and 34 respectively) coupled to the phase shitting circuit (i.e., noted LD4, LG4 or Phase shifter 1 & 2 of Figs. 4, 26 and 34), the bandwidth of the filter being selected to pass a wanted signal in one of the first and second frequency bands but reject an unwanted signal in the other of the second and first frequency bands (i.e., noted that the band passed SAW filter as shown in Figs. 3, 4, 25, 26 and 34 of Kemmochi meets this limitations; see paragraphs 0004+ and 0093+ of Kemmochi ), and a low noise amplifier (i.e., noted the use of LNA for the receiving means in mobile communication devices as shown in Figs. 36-38 of Kemmochi ) coupled to an output of the band pass filter (i.e., as shown in Figs. 36-37, the LNA is normally coupled to the band passed filter 'fg2', thus, the BPF 'fg2' as shown in Fig. 34 must be connected to the LNA circuit), wherein each of the phase shifting circuits (i.e., noted the phase shifting circuit LD4 as shown in Figs. 4, 25, 26 and 34). Kemmochi does not specifically

disclose each of the phase shifting circuits is impedance transforming from a lower impedance to a higher impedance. However, Sugar et al. (figure 8) disclose phase shifting unit (515, 525) is impedance transforming (column 12, line 56 – column 13, line 7), and it is either inherent or obvious for the impedance transforming of Sugar et al. to transform from higher impedance to lower impedance or from lower impedance to higher impedance. Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the phase shifting circuits of Sugar et al. to the multi-mode radio module of Kemmochi for performing shorting the connection or creating an open circuit depending on the position of the switch in the multi-mode environment (as suggested by Sugar et al., column 13, lines 2-7).

Regarding claim 3, Kemmochi discloses in that each of the band pass filters (i.e., noted the BPF labeled as "fg2/fp2" as shown in Figs. 4 and 34 of Kemmochi ) is a SAW filter (i.e., see paragraphs 0093+).

Regarding claim 5, Kemmochi discloses in that the branching circuit is coupled to the terminal (antenna as shown in Figs. 3, 4, 25, 26 and 34) by way of a length of transmission line (i.e., noted the use of node IP as shown in Figs. 4 and 26 for coupling the branching circuits and antenna via a length of transmission lines as shown in Figs. 4 and 26).

Regarding claim 6, Kemmochi discloses by the transmitting branch having a series switch (i.e., noted the series switch for transmitting GSM/PCS signals to the antenna as shown in Figs. 26 and 34) coupled to the terminal (i.e., Antenna) and the

branching circuit having a shunt switch coupled to an end of the transmission line remote from the terminal (i.e., noted the shunt switch "Dr/Pr" coupled to and end of the transmission line as shown in Fig. 26, which is remote to the antenna).

Regarding claim 7, Kemmochi discloses in that a duplexer (i.e., noted the "DP" as shown in Figs. 3, 26 and 34) is coupled to the terminal (i.e., the Antenna), in that the transmitting and the branching circuit are coupled to a port of the duplexer for passing signals having frequencies lying in a first bandwidth and in that a further port is coupled to a further branch for processing signals having frequencies lying in a second bandwidth (i.e., as shown in Fig. 34, the antenna is coupled the duplexer having a changer-over switch SW to a GSM/PCS transmitter front end and to a branching circuit having branches for GSM receiver front end and PCS receiver front end, respectively).

Regarding claim 8, Kemmochi discloses a multi-mode radio comprising signal propagating and receiving means (i.e., noted the mobile communication devices having an antenna as shown in Figs. 3, 4, 25, 26, 34 and 36, respectively), means for modulating signals to be transmitted, means for demodulating received signals (i.e., noted that the RF signals received by the multi-band mobile communication device as shown in Figs. 3, 4, 25, 26, 34 and 36 performs modulation/demodulation of RF signals during a transmitting/receiving process) and a multi-mode radio module (i.e., see Figs. 4, 25, 26, and 34; see paragraphs 0005+ and 0166+) comprising a transmitting branch (i.e., noted the transmitting branch for EGSM and GSM/PCS bands as shown in Figs. 4, 25, 26 and 34) coupled to the signal propagating and receiving means (i.e., noted the connection of antenna to the transmission lines for EGSM and GSM/PCS), the

modulating means being coupled to a signal input of the transmitting branch (i.e., see noted the modulation of RF signals before transmission as shown in Fig. 34 & 36-38), and a branching circuit coupled to the signal propagating and receiving means (i.e., noted the connection of antenna to the transmission lines for EGSM and GSM/PCS), the branching circuit comprising at least a first and a second branch for receiving signals in first and second frequency bands, respectively, each of the first and second branches comprising, respectively (i.e., noted the first and second branch for receiving EGSM900 and GSM1800/PCS frequency bands as shown in Figs. 3, 4, 25, 26 and 34), a phase shifting circuit (i.e., noted the use of Phase shift circuit LG4, LD4, and Phase shifter 1 & 2 as shown in Figs. 4, 26 and 34 respectively), a band pass filter (i.e., noted the SAW/fg BPF as shown in Figs. 3, 4, 25, 26 and 34 respectively) coupled to the phase shifting circuit (i.e., noted LD4, LG4 or Phase shifter 1 & 2 of Figs. 4, 26 and 34), the bandwidth of the filter being selected to pass a wanted signal in one of the first and second frequency bands but reject an unwanted signal in the other of the second and first frequency bands (i.e., noted that the band passed SAW filter as shown in Figs. 3, 4, 25, 26 and 34 of Kemmochi meets this limitations; see paragraphs 0004+ and 0093+ of Kemmochi ), and a low noise amplifier (i.e., noted the use of LNA for the receiving means in mobile communication devices as shown in Figs. 36-38 of Kemmochi ) coupled to an output of the band pass filter (i.e., as shown in Figs. 36-37, the LNA is normally coupled to the band passed filter 'fg2', thus, the BPF 'fg2' as shown in Fig. 34 must be connected to the LNA circuit), the respective LANs being coupled to the demodulating means (i.e., as shown in Figs. 34 and 36, the receiving output of the

PCS and GSM has to coupled to the respectively LANs, and the output of the LANs is normally coupled to the RF demodulator/mixer of the receiver of the mobile communication device) wherein each of the phase shifting circuits (i.e., noted the phase shifting circuit LD4 as shown in Figs. 4, 25, 26 and 34) is impedance transforming. Kemmochi does not specifically disclose each of the phase shifting circuits is impedance transforming from a lower impedance to a higher impedance. However, Sugar et al. (figure 8) disclose phase shifting unit (515, 525) is impedance transforming (column 12, line 56 – column 13, line 7), and it is either inherent or obvious for the impedance transforming of Sugar et al. to transform from higher impedance to lower impedance or from lower impedance to higher impedance. Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to adapt the phase shifting circuits of Sugar et al. to the multi-mode radio module of Kemmochi for performing shorting the connection or creating an open circuit depending on the position of the switch in the multi-mode environment (as suggested by Sugar et al., column 13, lines 2-7).

Regarding claim 10, Kemmochi discloses by the transmitting branch having a series switch (i.e., noted the series switch for transmitting GSM/PCS signals to the antenna as shown in Figs. 26 and 34) coupled to the terminal (Antenna) and the branching circuit having a shunt switch coupled to one end of a quarter wavelength transmission line, the other end of the transmission line being coupled to the terminal (i.e., noted the shunt switch "Dr/Pr" coupled to and end of the quarter wavelength

transmission line as shown in Fig. 26, and the other end of the transmission is coupled to the antenna as claimed).

Regarding claim 11, Kemmochi discloses in that a duplexer (i.e., noted the Duplexer "DP" as shown in Figs. 3 and 34) is coupled to the terminal (i.e., Antenna), in that the transmitting and the branching circuit are coupled to a port of the duplexer for passing signals having frequencies lying in a first bandwidth and in that a further port is coupled to a further branch for processing signals having frequencies lying in a second bandwidth (i.e., noted the different frequency bandwidths coupled to the duplexer "DP" as shown in Figs. 26 and 34 respectively).

Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Kemmochi in view of Sugar et al. and further in view of Ella et al. (US 6,751,470).

Regarding claim 2, it is noted that Kemmochi and Sugar et al. does not explicitly state the use of the BAW band pass filter. However, the above-mentioned claimed limitations are well known in the art as evidenced by Ella. In particular, Ella teaches the use of BAW band pass filter in the multi-band mobile communication for the purpose of achieving superior power handing capability has been known to one of the ordinary skilled in the art at the time of the invention was made (i.e., see col. 7, lines 5-15). In view of the above, having the multi-band mobile communication system of Kemmochi and Sugar et al. and then given the well-established teaching of Ella, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to

use a BAW type band pass filters as taught by Ella, since Ella states in col. 7, lines 5-10 that such a modification would provide superior power handling capability to the mobile communication system.

Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kemmochi in view of Sugar et al and further in view of Hikita et al. (U.S. 6,525,624).

Regarding claims 4 and 9, it is note that although Kemmochi show the use of the phase shifting circuit (i.e., noted the phase shift circuits as shown in Figs. 4, 25, 26 and 34 of Kemmochi) to provide a predetermined impedance transformation between that of the signal propagating and receiving means (i.e., antenna) and the respective band pass filter (i.e., noted the SAW filters as shown in Figs. 4, 25, 26 and 34 of Kemmochi; and also see paragraphs 0086-0089), Kemmochi does not explicitly show that each of the phase shifting circuit, (PS 1,PS2) comprising a series capacitance and a shunt inductance as recited in present claimed invention. However, the above-mentioned claimed limitations are well known in the art as evidenced by Hikita . In particular, Hikita teaches the use of the phase shifting circuits (i.e., see Fig. 4, the element 14) comprises a series capacitance and a shunt inductance (i.e., noted the series capacitance 26 and shunt inductance 27 as shown in Fig. 12D), the value of the series capacitor (26) and the shunt inductance (27) being such as to provide a predetermined impedance transformation between that of the signal propagating and receiving means (i.e., the antenna as shown in Fig. 4) and the respective band pass filter (i.e., noted the

SAW filter as shown in Fig. 4; see col. 10, lines 40+ and col. 11, lines 15+). In view of the above, having the multi-band mobile communication system of Kemmochi and Sugar et al. and then given the well-established teaching of Hikita , it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the phase shift circuit of Kemmochi and Sugar et al. as taught by Hikita , since Hikita states in col. 3, lines 5+ that such a modification would provide an antenna duplexer which is micro-miniaturized and reduced in weight, thus, the miniaturization of a radio terminal can be realized.

***Response to Arguments***

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quochien B. Vuong whose telephone number is (571) 272-7902. The examiner can normally be reached on M-F 9:30-18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quochien B Vuong/
Primary Examiner, Art Unit 2618